Multidisciplinary Team Training Simulation in Interventional Radiology

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Efficient teamwork and communication is critical for the delivery of safe and high quality patient care. Studies have shown that medical errors can occur as a result of poor communication. Simulation scenarios can help improve communication and teamwork, therefore decreasing errors and improving team morale. Simulation is best employed through a multidisciplinary approach, including all members of the team involved in the patient's care. Team simulation can be difficult to plan and execute, therefore we will review the steps to planning an effective multidisciplinary team simulation, as well as the barriers to overcome when implementing these programs. In addition, the structure and value of debriefing sessions will be discussed. Debriefing has been shown to help participants identify latent errors and voice concerns in a safe, confidential setting. Lastly, we will review the value of multidisciplinary team simulation, focusing on the current literature among multiple medical disciplines. There has been a push for implementation of team simulation in healthcare in recent years, yet there is still a need for future research on this subject to demonstrate the direct effect of team simulation on patient care, especially in the dynamic field of Interventional Radiology.
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E ffective teamwork plays an important role in the delivery of safe and high quality patient care. Barriers such as failed communication, ineffective interpersonal skills, interprofessional tension, and poor team interaction can negatively impact patient care. Within medicine, each professional group has its own hierarchical structure. A lack of interprofessional communication can isolate these groups against each other, termed the "silo mentality." When members of the clinical care team come from "silos" of clinical training that do not overlap, teamwork and communication can suffer, leading to significant adverse events. For example, the Joint Commission on Accreditation of Health Care Organizations demonstrated that poor communication was causative in two-thirds of almost 3000 serious medical errors.[1]

Simulation can improve interprofessional communication, improve the ways in which teams function, and therefore decrease adverse events. Simulation of scenarios allows the members of the team to understand each other's perspective and skills, improve communication, and identify shared goals. For example, a study showed that having operating room staff attend a dedicated training session (including role-play, training films, and clinical vignettes) led to improved communication between surgeon and anesthesiologists, as well as improved use of deep vein thrombosis (DVT) prophylaxis in the operating room.[2] Another study showed an overall decrease in case delays in the operating room following an intensive medical team training day which included role-playing and debriefing.[3] These results were maintained up to a 2-year period following the training exercise. The term "Team Situational Awareness" refers to a shared understanding among team members, which has been shown to facilitate team coordination and task performance. A multicenter study in Emergency Medicine demonstrated a positive correlation between team clinical performance in a simulation task and reported team situational awareness.[4]

Steps to Implementation

There are many benefits of multidisciplinary team training, however planning a team simulation can be challenging. All

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members involved in the clinical care of patients in a normal routine workday should have representation in the planning phases of the simulation program and should be involved in the training event. Interventional Radiology is typically run as a stand-alone unit that performs patient registration, patient intake, procedure performance including sedation, and patient recovery and discharge. Therefore, all disciplines and stakeholders need to be included in the simulation event as well as planning stages. Involvement of each discipline in the planning stage will allow the simulation event to have components targeted toward each participant. By keeping each care group engaged in the event, they will learn from their experience and improve the way they deliver clinical care to patients.

The first step in planning a team simulation is determining the key players in the clinical care team. In an Interventional Radiology team simulation, members of the care team should include attending physicians, fellow physicians, resident physicians, nurse practitioners, physician assistants, nurses, radiology techs, and administrative assistants. Steps to designing a team based simulation activity are shown in Figure 1.

Once the planning committee has been formed, the second step is to identify areas of weakness. Each committee member should self-reflect on their individual and group performance caring for patients. This will allow each group member to identify areas of weakness within their discipline or during interactions with other disciplines. These areas of weakness will become the central component of planning the remainder of the event since it will dictate the ultimate goal. In order to identify areas of need, each involved team member should ask themselves a few questions about their section. Have you observed communication breakdown among team members that has affected patient care? Are there gaps in the knowledge of your team to optimally manage your patients? Are there identifiable infrastructure barriers? Do you have optimal personnel? Are there physical barriers to implementation of optimal patient care? Do you have enough space or appropriate allocation of materials throughout the space?

The third step is to choose the optimal location for your team-based simulation training. Simulations can be performed in a multitude of settings, each with advantages and disadvantages. Many institutions have surgical simulation centers which allow for video recording from all angles, realistic operating suites and simulation mannequins to create a false reality. While expensive surgical simulation centers are helpful, they are not necessary for a successful team simulation. A review article showed that in 27 simulation-based team training studies, only 16 centers had high fidelity simulation centers.[5] Also, the simulated operating room does not mimic all "real world" work spaces or scenarios. Table 1 compares the advantages and disadvantages of performance in situ vs a simulation center. Running a simulation event in a "work" area is extremely challenging logistically, but allows the team to function in their usual surroundings. This will allow the participants to suspend reality more easily and potentially identify issues that can be fixed to improve patient safety and/or patient care.

The fourth step is implementing the program, which can be the most difficult. Following the first 3 steps will help gain momentum in achieving a successfully implemented program, although each member of the team will need to be a motivated participant. Regularly scheduled planning committee meetings, detailed design of the procedure day, and detailed case design and debrief planning will help the day to go smoothly and create an atmosphere of interest and education. Each member of the planning committee needs to be encouraged to be the "champion" for their discipline and voice of their group. When planning the logistics of the simulation day event, every member of the department who you would like to be involved in the simulation day event must be accounted for at all times. If the event is to be performed during regular business hours, in situ or at a simulation center, the staff must be assigned to clinical work as well as simulation. Since simulation is not natural for most participants, an orientation to case simulation should be included at the start of the event to teach individuals about appropriate behavior for simulation and methods to improve group learning.

Barriers to Implementation

There are multiple barriers to implementing a successful simulation program, including the time requirement, departmental buy-in and participant buy-in. First, planning requires dedicated time from all parties to participate in planning meetings. Second, administrative approval is necessary to close a department or reduce clinical volume. Most importantly, the participants need to believe that this is simulated reality in order for the event to be successful.

Debriefing is critical following the simulation event. This consists of a time for the participants to discuss their performance on the simulated case. Adequate time should be included for debriefing in the time allocated for each case. People learn from reflecting on their experience and identifying what each individual learned about themselves and others more than the experience itself. Establishing a positive debriefing environment will lead to more effective
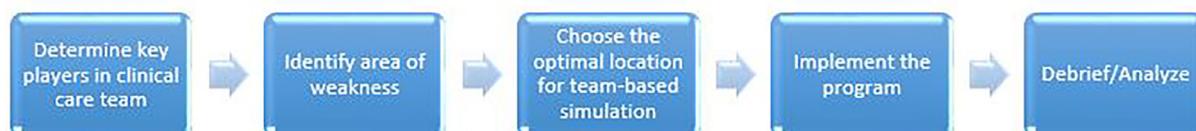
Figure 1 Steps to designing a team based simulation. First, determine key players in clinical care team. Second, identify areas of weakness. Third, choose the optimal location for simulation. Fourth, implement the program. Last, debrief and analyze.

Table 1 Differences Between In Situ Simulations Vs Sim Lab Simulations

In Situ		Sim Lab	
Advantages	*Disadvantages*	*Advantages*	*Disadvantages*
Known environment Identify system/infrastructure issues	**Lost cost of closing procedure rooms lack of observation area need video equipment**	**Prepared for simulation observation areas and video ready**	**Foreign environment less realistic high direct cost**

debriefing.[6] During orientation, it is important to inform the participants of the ground rules of debrief to allow for maximum learning. There should be a supportive environment where each individual can feel valued, respected and free to learn without fear of judgment. Each participant should share experiences in a frank, open, and honest manner. Each participant should respect the vulnerability of others when making comments. The members of the team should honor confidentiality and speak for oneself and not for others. An immediate debrief should be structured with preplanned questions to probe the team and question their abilities to communicate effectively. Some sample questions may include: Identify aspects of the simulation activity that were performed well; Identify aspects of the simulation activity that need improvement; are there specific barriers to optimal performance; Were there any safety issues that you identified during the simulation?; Did prior experiences adequately prepare you for this?; Did this experience increase awareness of gaps in personal knowledge?; Do you feel the perceived organizational hierarchy prevented you from voicing your concerns?

Value of Simulation

Overall, team simulation can significantly improve communication and workflow efficiency, which helps improve patient care and minimize adverse events. Effective team simulation should include all members of the health care team, be well planned in advance, and organized during the event. Debriefing at the conclusion of team simulation will allow team members to reflect on their experience, better work together as a team, and identify issues for the future real-life scenarios. Data from multiple medical subspecialties have proven the usefulness of multidisciplinary team training simulation. A recent retrospective study from a trauma department in 2018 showed a statistically significant decrease in time to CT evaluation in trauma patients following multidisciplinary team simulation, as well as a statistical significant increases in subjective knowledge and self-confidence among

staff.[7] A recent article reviewed 17 articles studying multidisciplinary team training from 2008 to 2018 and summarized the evidence. They found that included participants felt invested in the process of change, felt encouraged to speak up, and helped identify latent safety threats in the debriefing session.[8] This study also emphasized the need for further research of multidisciplinary team training and its direct effects on patient outcomes. In conclusion, multidisciplinary team simulation training is an extremely useful tool and future research will continue to demonstrate its importance in communication, technical skills, and therefore patient care. We encourage interventional radiology departments to employ this as a valuable training tool, especially with the unique multidisciplinary dynamic of IR care.

References

1. Joint Commission International Center for Patient Safety. Communication: A Critical Component in Delivering Quality Care. Oakbrook Terrace: Joint Commission on Accreditation of Healthcare Organisations, 2009 Ref Type: Report
2. Awad SS, Fagan SP, Bellows C, et al: Bridging the communication gap in the operating room with medical team training. Am J Surg 190:770-774, 2005
3. Wolf FA, Way LW, Stewart L: The efficacy of medical team training: improved team performance and decreased operating room delays: A detailed analysis of 4863 cases. Ann Surg 252:477-483, 2010
4. Rosenman ED, Dixon AJ, Webb JM, et al: A simulation-based approach to measuring team situational awareness in emergency medicine: A multicenter, observational study. Acad Emerg Med 25:196-204, 2018
5. Weaver SJ, Salas E, Lyons R, et al: Simulation-based team training at the sharp end: A qualitative study of simulation-based team training design, implementation, and evaluation in healthcare. J Emerg Trauma Shock 3:369-377, 2010
6. Lyons R1, Lazzara EH, Benishek LE, et al: Enhancing the effectiveness of team debriefings in medical simulation: More best practices. Jt Comm J Qual Patient Saf 41:115-125, 2015
7. Knobel A, Overheu D, Gruessing M, et al: Regular, in-situ, team-based training in trauma resuscitation with video debriefing enhances confidence and clinical efficiency. BMC Med Educ 18:127, 2018
8. Armenia S, Thangamathesvaran L, Caine AD, et al: The role of high-fidelity team-based simulation in acute care settings: A systematic review. Surg J (N Y) 4:e136-e151, 2018